

Genetic Engineering: The Controversy

Genetic engineering of the human food supply is a highly contentious issue, with credentialed scientists arguing on each side. Most likely the controversy will continue. The effort by biotech companies to genetically modify food will continue to increase and resistance by consumers to genetically modified food will continue to grow.

Overview

PRO: Genetic engineering is a valuable new technology that can develop more plentiful and nutritious foods, with great potential benefits for humanity and the environment, and this new scientific discovery needs to be implemented as quickly as possible for humanitarian reasons.

CON: As with every new scientific technology, harmful side effects of genetic engineering are inevitable and great care should be taken in its implementation, including carefully controlled long-term tests on human health and environmental impacts.

Natural Or Unnatural?

PRO: Genetic engineering is a natural extension of traditional breeding; just as conventional breeding allows us to combine valuable traits within closely related species, genetic engineering allows scientists to access genes from a broader range of organisms to produce more valuable and productive crops and livestock.

CON: Genetic engineering uses artificial laboratory techniques, rather than natural reproductive mechanisms, techniques which breach natural reproductive barriers and combine genes from distant species in ways that could never occur in nature -- suddenly altering genetic patterns that have developed over millions of years, and greatly increasing the likelihood of unanticipated side effects.

Is The Process Precise?

PRO: While natural breeding is an imprecise and uncontrolled combination of thousands of genes, genetic engineering is a precise technological process that allows scientists to first select the specific gene desired and then use "gene guns" and other techniques to insert that gene in the target organism precisely.

CON: The choice of which gene to insert is indeed precise. But the insertion of this gene into a living cell is highly imprecise, with no control over where in the DNA the new gene is inserted. This unnatural process can disrupt the natural genetic information encoded in the DNA, as well as the regulation of gene expression, in ways that are uncontrolled and unpredictable.

Have Tests Been Conducted?

PRO: All genetically engineered foods have been thoroughly tested and demonstrated to be safe before they are released into the marketplace.

CON: This testing is typically conducted only on rats and other animals, by the companies involved. Very little of this research has been reviewed by independent scientists and then published in scientific journals, and the FDA does not review the research methodology. Such a process is considered only preliminary with, for example, food additives and pharmaceutical drugs.

Is Human Testing Needed?

PRO: Genetically engineered foods are usually "substantially equivalent" to other foods, with no increased risk to human health, and no need for the lengthy and expensive human testing demanded of, for example, new food additives.

CON: The unpredictable disruptions in normal DNA functioning caused by genetic engineering can produce unanticipated and unknown side effects for human health, including unknown and unpredictable toxins and allergens, and these possibilities can only be definitively assessed through human testing.

Is Safety Demonstrated?

PRO: Genetically engineered foods have been sold in the United States for several years and there is no evidence to indicate that these foods have harmed human health in any way.

CON: There is also no evidence that genetically engineered foods are safe for human health. The reason is the same in both cases: no human studies have been conducted. There is no objective way to determine if any of these foods have long-term effects that negatively impact human health.

Can We Eat Pesticide Foods Safely?

PRO: Certain genetically engineered potatoes and corn produce their own Bt, a pesticide that protects the crop from insects, thus decreasing costs and increasing yield with no negative impact on human health.

CON: These foods are regulated as pesticides by the EPA. When Bt is sold as a pesticide, people are warned not to swallow it, breathe it, or get it in cuts. Yet potatoes and corn that produce their own Bt are sold with no human testing.

The Future of Organics

PRO: If people do not wish to eat genetically engineered foods then they have an option now; they can eat organic foods which, according to rules released by the United States Department of Agriculture, must be free of all genetic engineering.

CON: Genetic engineering itself damages organic farming; genetically engineered corn, for example, outcrosses with organic corn in nearby fields and contaminates the crop; genetically engineered corn and potatoes containing the Bt toxin will produce insects resistant to Bt, making Bt spray ineffective for organic farmers.

Environmental Impacts

PRO: The use of genetic engineering in agriculture will increase crop productivity, thereby reducing the demand for agricultural land, while it will also reduce the use of herbicides and pesticides, thereby reducing the damage done to the environment through modern agrichemical farming technologies.

CON: Several studies have been done, and there is little evidence to show that genetic engineering increases crop yield or reduces herbicide and pesticide use. Meanwhile, research has shown that genes for resistance to herbicides will outcross into the natural ecosystem, generating "super weeds," and that plants engineered to be pesticides will create resistant insect pests -- self-defeating processes that will irreversibly damage the environment. Moreover, no genetically modified food has yet been subject to an environmental impact study.

Science vs. Culture

PRO: Genetic engineering is a scientific and technological process, and its evaluation and governmental regulation should be based on purely scientific and objective criteria.

CON: To have a purely scientific evaluation of genetically engineered foods, we need more science, especially human studies and environmental studies. Moreover, purely scientific assessment of genetic engineering ignores the fact that, for many people, food has cultural, ethical and religious dimensions that must also be considered.

Patenting DNA

PRO: Genetic engineering produces specific and identifiable changes in the genome of living organisms which can be protected through patent, and this protection of intellectual property within the DNA (the "software" of living organisms) is fueling the rapid development of new and better food sources.

CON: Historically, farmers have created the world's crop varieties through natural breeding. To allow large corporations to use small genetic changes to take control of these collectively produced resources, as well as the evolutionary process itself, is to risk that these corporations will take control of agricultural output worldwide. Indeed, if a few large biotech businesses in Western nations have control of the seed used around the world, serious questions will arise about the independence and national sovereignty of all other nations.

Should There Be Labels?

PRO: Most people can't tell the difference between conventional and genetically engineered foods, and given a choice, they will buy what is least expensive.

CON: In nearly every country where polls have been taken, large majorities say they want genetically engineered foods to be labeled, so informed choices can be made.